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(71) Applicant *(for all designated States except US)*: KIM, Si, Won [KR/KR]; Kolong Apt. 2–1401, 151 Ne–dong, Seo–ku, Taejeon Metropolitan City 320–181 (KR).

(71)(72) Applicant and Inventor: CHOI, Sung, Hyuk [KR/KR]; Chungku Naerae Apt. 108–404, Chunmin–dong, Usung–ku, Taejeon Metropolitan City 305–390 (KR).

(74) Agent: IM, Jae, Ryong; RM 502, New Seoul Building, 828–8, Yeoksam–dong, Kangnam–ku, Seoul 135–080 (KR).

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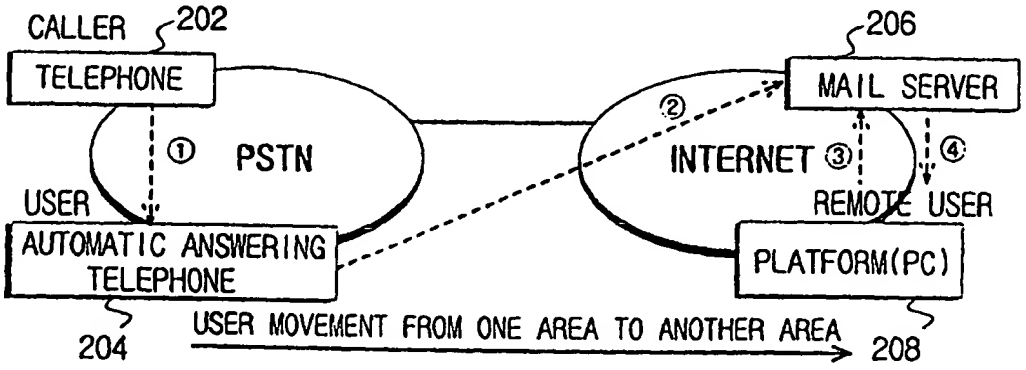
(54) Title: AUTOMATIC ANSWERING TELEPHONE ACCESSIBLE TO INTERNET



(57) Abstract

The present invention relates to an automatic answering telephone accessible to Internet. The present invention is provided to allow an automatic answering telephone to access the Internet and transmit voice data recorded therein to an Internet mail server by way of an e–mail. The present invention is provided for an automatic answering telephone so as to send a user's prerecorded announcement to a caller, store a voice signal of the caller, and transmit the stored voice signal to a mail server when there is an incoming call during the user's absence. The automatic answering telephone accessible to the Internet according to the present invention comprises: an analog to digital converter (316) for converting the caller's voice signal to a digital signal; a storage unit (318) for storing the digital voice signal received from the analog to digital converter (316); an e–mail generator (326) for generating an e–mail from the voice signal stored in the storage unit (318); and a transmitter (324) for transmitting the e–mail to the Internet mail server.

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AUTOMATIC ANSWERING TELEPHONE ACCESSIBLE TO INTERNET

Technical Field

This invention relates to a digital automatic answering telephone and more particularly to a digital automatic answering telephone accessible to internet.

Background Art

Major functions of an automatic answering telephone are to send prerecorded announcement to a caller and to record an incoming voice signal from the caller during a user's absence. Through the automatic answering telephone, the user at a remote place also can reproduce the caller's voice signal recorded in an automatic answering machine or modify the user's announcement to be sent to the caller. Besides, the automatic answering telephone has various other functions.

Such automatic answering telephone can be classified into an analog system and a digital system depending upon a device employed for storing voice signals. The automatic answering telephone employing the analog system uses a tape as the voice signal storage unit while the automatic answering telephone employing the digital system uses digital memory as the voice signal storage unit.

FIG. 1 is a block diagram for illustrating a conventional

automatic answering telephone employing the digital system. The conventional digital automatic answering telephone includes: a telephone line interface 102 for receiving analog voice signals; a digital signal converter 104 for converting the analog voice signals received via the telephone line interface 102 into digital signals; a storage unit 106 for storing the digital voice signals received from the digital signal converter 104; a reproduction unit for reproducing the voice signals stored in the storage unit 106 according to a control signal produced by a controller 108; an analog signal converter 112 for converting the digital voice signals reproduced by the reproduction unit 110 into analog signals; and a voice signal output unit 114 for outputting reproduced and converted analog voice signals.

Remote control over such automatic answering telephone as described above is effected such that a user calls the corresponding telephone. This control method has already been known to those skilled in this field, so detailed description on this method will be omitted.

In such conventional remote control over the automatic answering telephone, it happens that the user should be on the telephone for a long time to check many messages stored in the storage unit. Therefore, if the user makes a long-distance call or uses the international telephone service to check all

the messages, it happens that the user should spend much money on calling up.

Summary of the Invention

To overcome the above-discussed defects, it is an objective of the present invention to provide an automatic answering telephone accessible to internet, wherein voice information can be automatically transmitted to a mail server, thereby allowing a user to check stored voice information through a computer.

Another objective of the present invention is to provide an automatic answering telephone that is accessible to internet and has a voice information compressing function for reducing data volume of the voice information when automatically transmitting the voice information to an internet mail server.

To achieve the above objectives, an automatic answering telephone, which is accessible to internet and sends a user's prerecorded announcement to a caller, stores a voice signal of the caller, and transmits the stored voice signal to a mail server when there is an incoming call during the user's absence, comprises: analog to digital converting means for converting the caller's voice signal to a digital signal; storage means for storing the digital voice signal received

from the analog to digital converting means; e-mail generation means for generating an e-mail from the voice signal stored in the storage means; and transmitting means for transmitting the e-mail to the internet mail server.

The storage means includes compressing means for compressing the voice signal before storage. The automatic answering telephone accessible to the internet further comprises: e-mail receiving means for receiving the e-mail transmitted from the internet e-mail server; and storage means for storing the received e-mail.

Brief Description of Drawings

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

FIG. 1 is a block diagram of a conventional automatic answering telephone;

FIG. 2 shows a configuration of an overall network to which an automatic answering telephone according to the present invention is applied;

FIG. 3 is a detailed block diagram of an automatic answering telephone according to the present invention;

FIG. 4 is a control flow chart showing operations from reception of an incoming call to e-mail transmission to a mail server;

FIG. 5 is a flow chart showing how an e-mail message is received from a mail server;

FIG. 6 is a flow chart showing how messages stored in an automatic answering telephone are heard via a user interface; and

FIG. 7 is a flow chart showing how a mail address for e-mail transmission and reception is modified via a user interface (automatic answering machine control function).

Best Mode for carrying Out the Invention

With reference to the accompanying drawings, the present invention will now be described in detail.

The present invention is realized by adding a function of accessing a network such as internet and a function of compressing voice signals to a general automatic answering telephone, thus allowing a user to play the voice signals at a remote place from the corresponding telephone.

During a user's absence, analog voice signals input into an automatic answering machine are converted to digital signals. The digital signals are then compressed. When compressing the digital signals, usual compression methods

such as PCM, ADPCM, and MP3 are employed.

The digital voice signals compressed and stored are transmitted to a mail server using an e-mail function of the automatic answering machine. The user at a remote place can access the corresponding mail server and play the digital voice signals.

FIG. 2 shows a configuration of an overall network to which the present invention is applied. The following concerns an embodiment of the present invention.

During a user's absence, a caller leaves a voice message in an automatic answering telephone via a telephone 202 and a public switched telephone network (PSTN) in a flow ①.

An automatic answering telephone 204 automatically transmits the voice signal of the caller's message to a mail server 206 via the PSTN and internet in a flow ② by way of an e-mail.

The remote user accesses the mail server (flow ③) and receives the e-mail containing the corresponding voice signal (flow ④) using a platform 208 (an apparatus having a function of accessing the internet, e.g., a personal computer (PC), a workstation, Macintosh, and the like). The user then plays the caller's voice signal at the platform 208.

Through such operations, the user that is remote from the corresponding automatic answering telephone due to regional

movement can be informed of content of the caller's message stored in the automatic answering telephone.

FIG. 3 shows a configuration of the automatic answering telephone according to the present invention.

As shown in FIG. 3, analog voice signals are input via a telephone line interface 314 into a digital signal converter 316. The input voice signals are converted into digital signals by the digital signal converter 316. The digital voice signals are transmitted from the digital signal converter 316 to a compressive storage unit 318. The compressive storage unit 318 compresses the digital voice signals using a compressor 318A and stores the compressed signals using a compressed data storage 318B, thereby increasing efficiency in transmitting data through the internet.

As a compression algorithm of the compressive storage unit 318 are employed PCM and ADPCM that are methods for compressing the voice signals and MP1, MP2, MP3, and AC-3 that are methods for compressing audio signals. In other words, the compressive storage unit 318 encodes the digital voice signals by way of voice signal compression and audio signal compression.

An e-mail generator 326 put the compressed digital voice information stored in the compressive storage unit 318 into the form of the e-mail. Output signals of the e-mail generator

326 are sent to an e-mail transmitter 324.

The e-mail transmitter 324 transmits the generated e-mail via MODEM or a PSTN interface such as an asynchronous digital subscriber loop (ADSL) to the mail server.

Compressively stored signals output from the compressive storage unit 318 are reproduced by a reproduction unit (decoder) 312. The reproduced digital voice signals are converted into analog signals by an analog signal converter 310. A user can play and hear the compressed voice signals through a voice signal output unit (speaker) 308 by directly manipulate the automatic answering telephone. The function of the reproduction unit 312, which is opposite to the function of the compressive storage unit, is decoding the compressed signals.

An e-mail receiver 304 receives the compressed e-mail via MODEM 302 from a corresponding mail server (not shown). An e-mail storage unit 306 stores compressed voice data contained in the received e-mail.

A user interface 328 modifies and inquires into a mail address of the mail server for e-mail transmission and reception, displays the number of current stored voice messages, and allows a user to hear the compressed voice messages.

The following description referring to FIGS. 4 through

7 concerns operation of such automatic answering telephone accessible to the internet according to the present invention.

FIG. 4 is a control flow chart showing operations from reception of an incoming call through e-mail transmission to a mail server.

Controls illustrated in FIG. 4 are carried out by a controller 320 depicted in FIG. 3 and reference numbers ①⑦ indicate control signals depicted in FIG. 3.

The controller 320 senses reception of a call via the telephone line interface 314 (S402). When a user does not answer the call in a predetermined time or when a user commences an absence mode via the user interface, the controller 320 determines a user's absence (S404). The controller 320 then sends an announcement to a caller requesting him/her to leave a voice message and processes the voice signal of the caller in the automatic answering machine.

Subsequently, the controller 320 commands the digital signal converter 316 to convert the analog voice signal into a digital voice signal (S406). The controller 320 then sends the compressor 318A, a command to compress the digital voice data through a specified compression method (S408). The compressed digital voice signal is stored in the compressed data storage 318B and the controller 320 senses a stored location of the voice signal and memory over flow (S410).

The controller 320 sends to the e-mail generator 326, a command to generate an e-mail based upon the compressively stored digital voice data (S412). The controller then controls the e-mail transmitter 324 so as to transmit the e-mail to a mail server corresponding to a predetermined address (S414). At this time, the controller 320 controls different transmission means, such as MODEM and ADSL, via the line ⑥.

As illustrated in FIG. 4, during the user's absence, the automatic answering telephone according to the present invention automatically compresses the input voice signal, generates the e-mail, and transmits the e-mail to the external mail server, thereby allowing the user at a remote place to check the content of the caller's message sent to the mail server in the form of data using a computer.

FIG. 5 is a flow chart showing an e-mail receive function of receiving the e-mail from the mail server.

Through a line ⓐ, the controller 320 senses a signal that is input via a telephone line (S502) and determines whether or not the sensed input signal is an e-mail signal (S502). If the e-mail signal, the controller 320 sends an e-mail receive command to the e-mail receiver 304 through line ⓑ (S506). The controller 320 then extracts compressed voice data from the e-mail and stores the data in an e-mail storage unit 306 (S508).

FIG. 6 is a flow chart showing operation through which a user can hear messages stored in the automatic answering telephone through the user interface 328 according to the present invention.

If a user presses a play button disposed in the user interface 328 to hear voice messages stored in the automatic answering telephone, the controller 320 in the automatic answering telephone senses that the play button is pressed (S602) and a voice data play command control signal through line A (S604). The controller 320 then sends a decoding start command to the reproduction unit 312 so as to decode the compressed digital voice data through a control line ⑦ (S606). Subsequently, the controller 320 sends a control command via a control line ⑧ to the analog signal converter 310 so as to convert the decoded digital voice signal to an analog voice signal (S608). The analog voice signal is output through the speaker 308.

FIG. 7 is a flow chart showing how a user can modify a mail address for e-mail transmission and reception through the user interface 328 depicted in FIG. 3.

When a user wants to modify or inquire about an address used for transmission and reception of the e-mail in the automatic answering telephone of the present invention, the user may press a mail server address modification and inquiry

button disposed in the user interface 328 (S702). Once the mail server address modification and inquiry button is pressed, the controller 320 senses a mail address input and inquiry signal (S704). The controller 320 then allows the user to enter a new mail address or displays a current mail address for the user (S706).

According to the present invention, an automatic answering telephone is allowed to access the internet, thereby making it possible for a user at a remote place to check callers' messages stored in the automatic answering telephone at a low price. Additionally, the present invention compresses voice data before storing it in the automatic answering telephone, thereby considerably decreasing the size of the data transmitted from the automatic answering telephone to a mail server.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as recited in the accompanying claims.

WHAT IS CLAIMED IS:

1. An automatic answering telephone accessible to internet, said automatic answering telephone sending a user's prerecorded announcement to a caller, storing a voice signal of the caller, and transmitting the stored voice signal to a mail server when there is an incoming call during the user's absence, said automatic answering telephone comprising:

analog to digital converting means for converting said caller's voice signal to a digital signal;

storage means for storing the digital voice signal received from said analog to digital converting means;

e-mail generation means for generating an e-mail from the voice signal stored in said storage means; and

transmitting means for transmitting the e-mail to said internet mail server.

2. An automatic answering telephone according to claim 1, wherein said storage means includes compressing means for compressing said voice signal before storage.

3. An automatic answering telephone according to claim 1 or 2, further comprising:

e-mail receiving means for receiving the e-mail transmitted from said internet e-mail server; and

storage means for storing said received e-mail.

FIG. 1

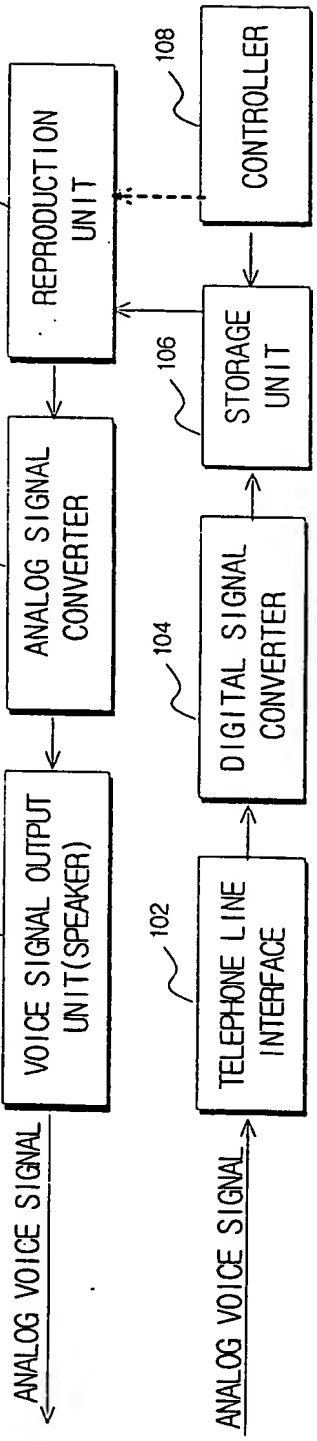

110
REPRODUCTION UNIT
108
CONTROLLER
106
STORAGE UNIT
112
ANALOG SIGNAL CONVERTER
104
DIGITAL SIGNAL CONVERTER
114
VOICE SIGNAL OUTPUT UNIT(SPEAKER)
102
TELEPHONE LINE INTERFACE
ANALOG VOICE SIGNAL
ANALOG VOICE SIGNAL

FIG. 2

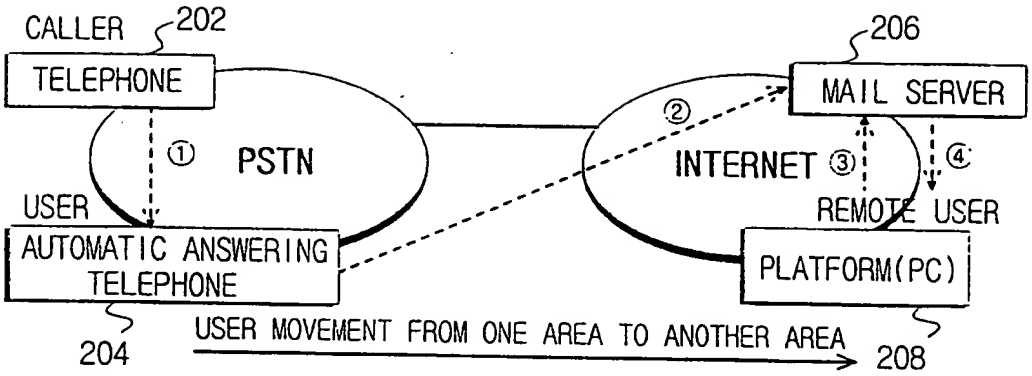

CALLER
202
TELEPHONE
①
PSTN
USER
AUTOMATIC ANSWERING TELEPHONE
204
206
MAIL SERVER
②
INTERNET ③
④
REMOTE USER
PLATFORM(PC)
208
USER MOVEMENT FROM ONE AREA TO ANOTHER AREA

FIG. 3

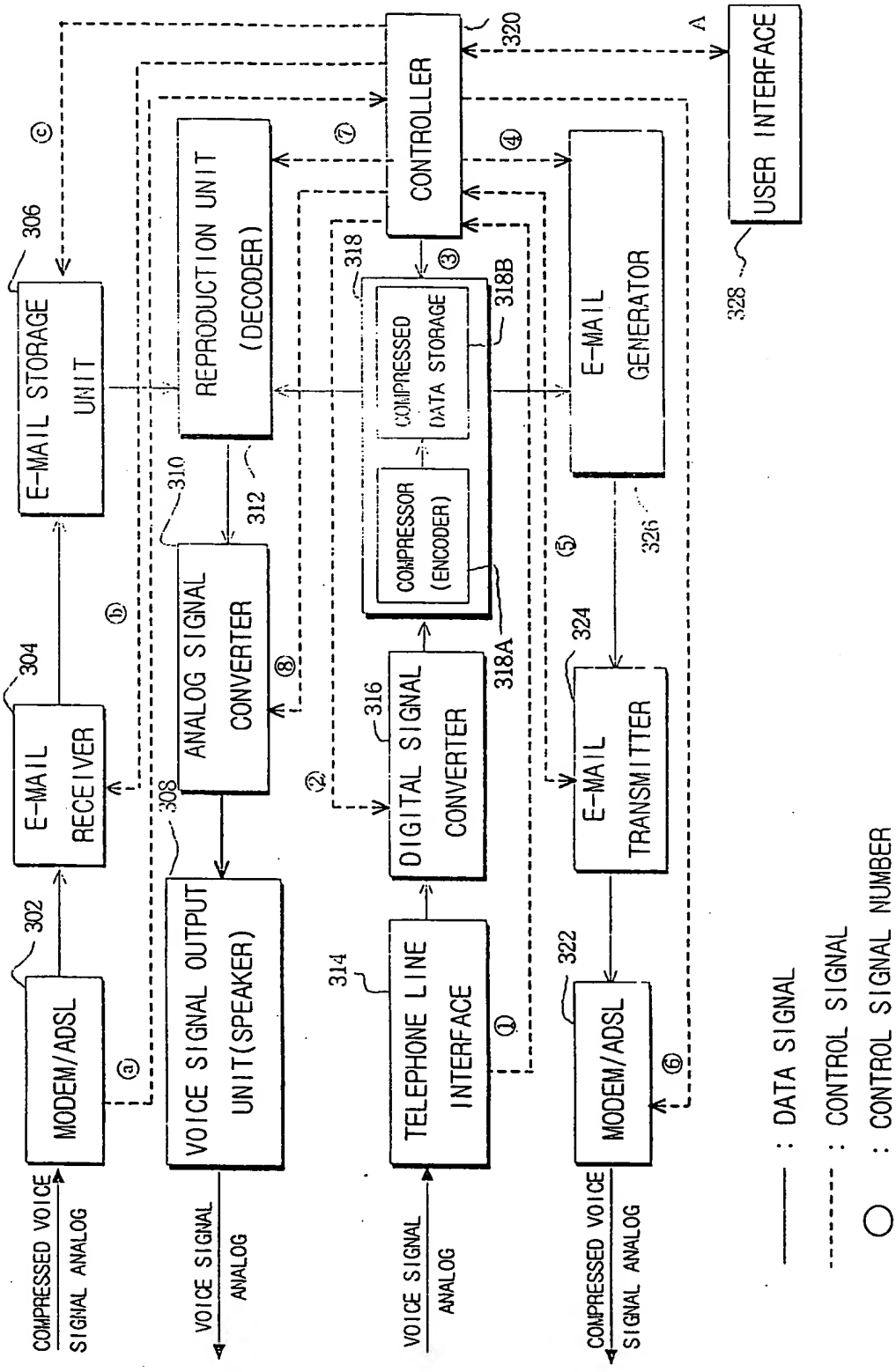

MODEM/ADSL
E-MAIL RECEIVER
E-MAIL STORAGE UNIT
VOICE SIGNAL OUTPUT UNIT(SPEAKER)
ANALOG SIGNAL CONVERTER
REPRODUCTION UNIT (DECODER)
TELEPHONE LINE INTERFACE
DIGITAL SIGNAL CONVERTER
COMPRESSOR (ENCODER)
COMPRESSED DATA STORAGE
CONTROLLER
E-MAIL GENERATOR
E-MAIL TRANSMITTER
MODEM/ADSL
USER INTERFACE
COMPRESSED VOICE SIGNAL ANALOG
VOICE SIGNAL ANALOG
VOICE SIGNAL ANALOG
COMPRESSED VOICE SIGNAL ANALOG
302
304
306
308
310
312
314
316
318
318A
318B
320
322
324
326
328
: DATA SIGNAL
: CONTROL SIGNAL
: CONTROL SIGNAL NUMBER

FIG. 4

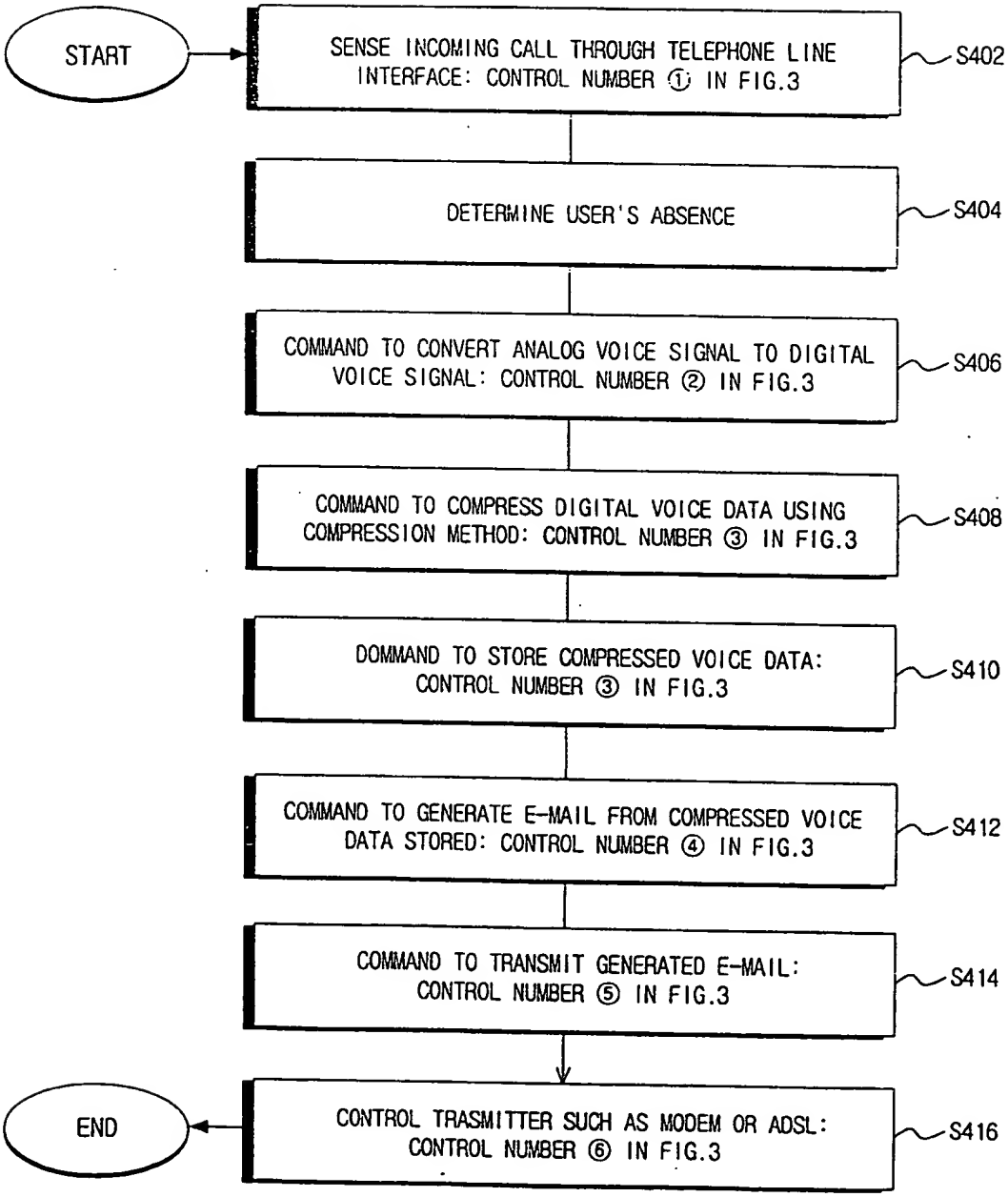

START
SENSE INCOMING CALL THROUGH TELEPHONE LINE INTERFACE: CONTROL NUMBER ① IN FIG.3
S402
DETERMINE USER'S ABSENCE
S404
COMMAND TO CONVERT ANALOG VOICE SIGNAL TO DIGITAL VOICE SIGNAL: CONTROL NUMBER ② IN FIG.3
S406
COMMAND TO COMPRESS DIGITAL VOICE DATA USING COMPRESSION METHOD: CONTROL NUMBER ③ IN FIG.3
S408
DOMMAND TO STORE COMPRESSED VOICE DATA: CONTROL NUMBER ③ IN FIG.3
S410
COMMAND TO GENERATE E-MAIL FROM COMPRESSED VOICE DATA STORED: CONTROL NUMBER ④ IN FIG.3
S412
COMMAND TO TRANSMIT GENERATED E-MAIL: CONTROL NUMBER ⑤ IN FIG.3
S414
END
CONTROL TRASMITTER SUCH AS MODEM OR ADSL: CONTROL NUMBER ⑥ IN FIG.3
S416

FIG. 5

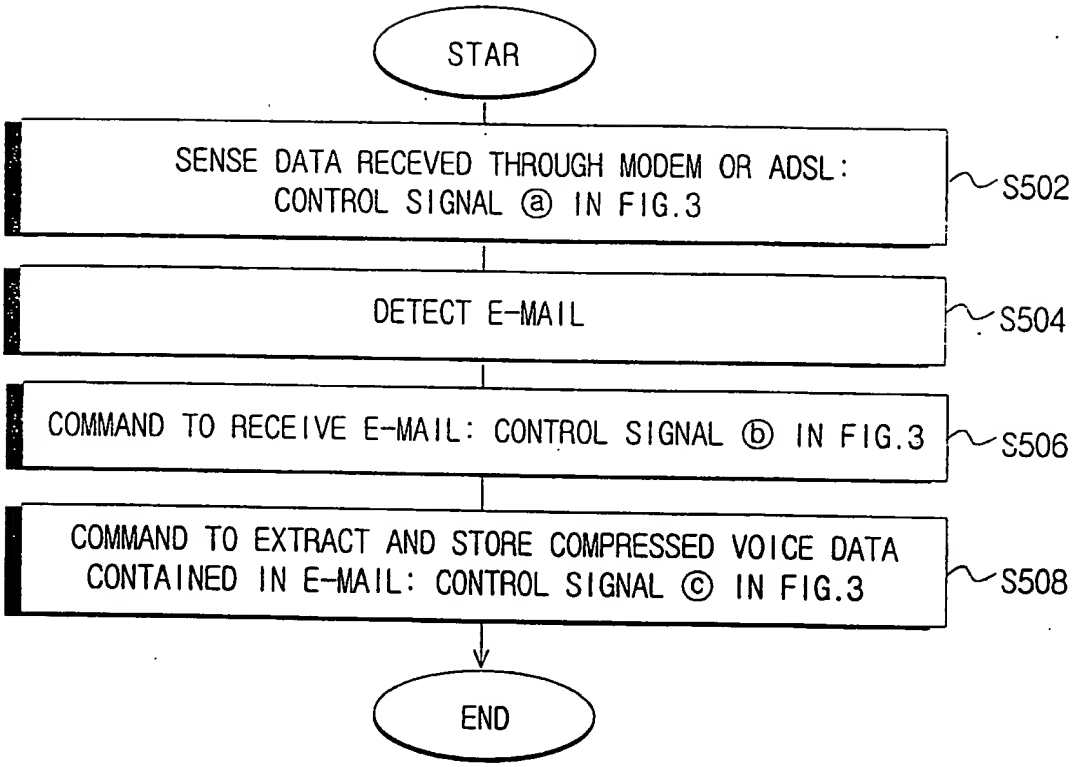

STAR
SENSE DATA RECEVED THROUGH MODEM OR ADSL: CONTROL SIGNAL ⓐ IN FIG.3
S502
DETECT E-MAIL
S504
COMMAND TO RECEIVE E-MAIL: CONTROL SIGNAL ⓑ IN FIG.3
S506
COMMAND TO EXTRACT AND STORE COMPRESSED VOICE DATA CONTAINED IN E-MAIL: CONTROL SIGNAL ⓒ IN FIG.3
S508
END

FIG. 6

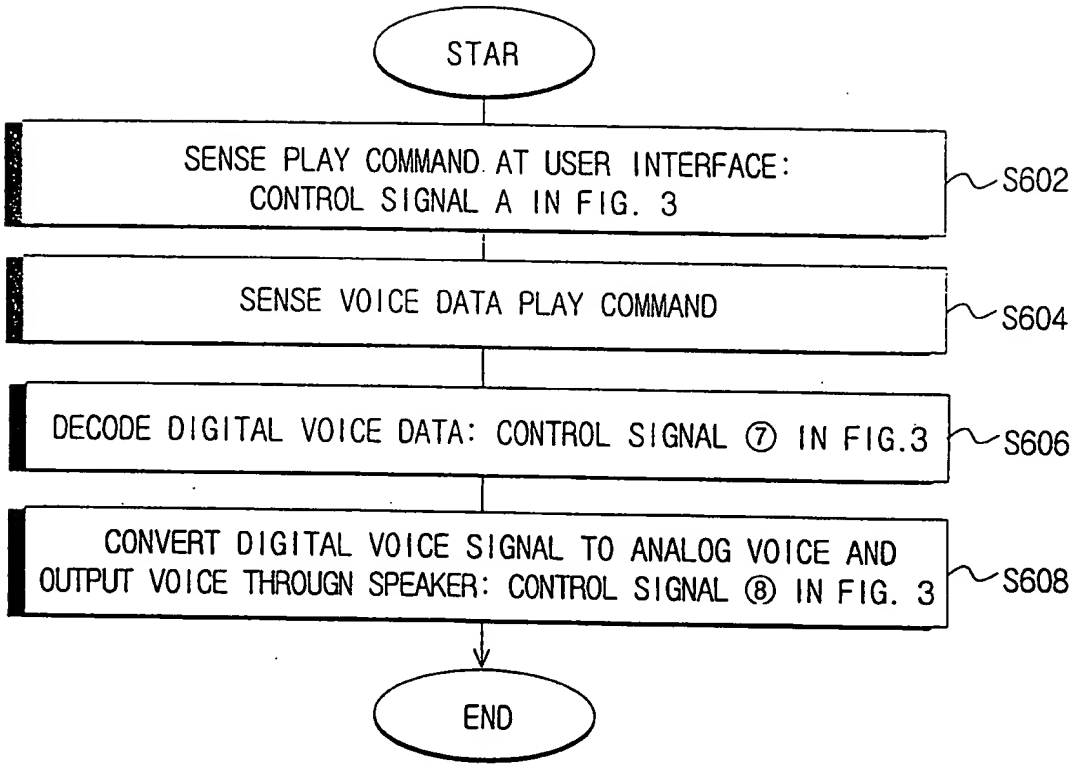
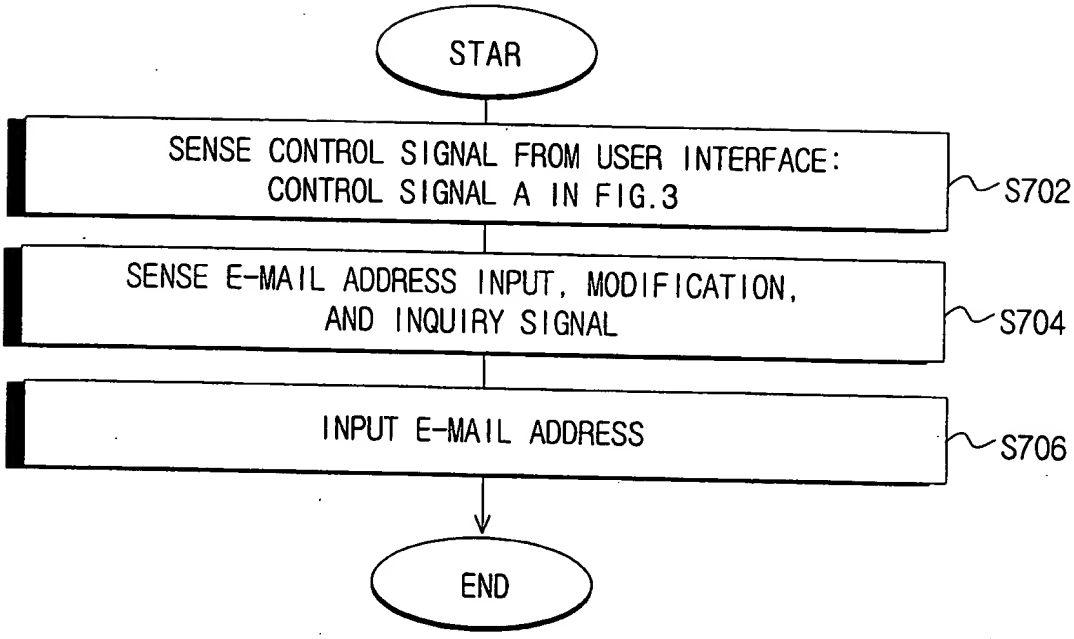

STAR
SENSE PLAY COMMAND AT USER INTERFACE: CONTROL SIGNAL A IN FIG. 3
S602
SENSE VOICE DATA PLAY COMMAND
S604
DECODE DIGITAL VOICE DATA: CONTROL SIGNAL ⑦ IN FIG.3
S606
CONVERT DIGITAL VOICE SIGNAL TO ANALOG VOICE AND OUTPUT VOICE THROUGN SPEAKER: CONTROL SIGNAL ⑧ IN FIG. 3
S608
END

FIG. 7


STAR
SENSE CONTROL SIGNAL FROM USER INTERFACE: CONTROL SIGNAL A IN FIG.3
S702
SENSE E-MAIL ADDRESS INPUT, MODIFICATION, AND INQUIRY SIGNAL
S704
INPUT E-MAIL ADDRESS
S706
END

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 99/00129

A. CLASSIFICATION OF SUBJECT MATTER

IPC[6]: H 04 M 1/64, H 04 M 3/50

According to International Patent Classification (IPC) or to both national classification and IPC

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and. where practicable, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 660 575 A2 (INTERNATIONAL BUSINESS MACHINES CORPORATION), 28 June 1995 (28.06.95), totality.	1,3
A	US 5 400 393 A (KNUTH et al.), 21 March 1995 (21.03.95), abstract; column 1, line 18 - column 3, line 36; column 4, line 23 - column 5, line 6; fig.1.	1,3
A	EP 0 798 899 A1 (KONINKLIJKE PTT NEDERLAND N.V.), 01 October 1997 (01.10.97), column 1, line 5 - column 4, line 23; fig.1.	1,3
A	EP 0 700 192 A1 (PHILIPS), 06 March 1996 (06.03.96), abstract.	1,2

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Date of the actual completion of the international search	Date of mailing of the international search report
24 August 1999 (24.08.99)	03 September 1999 (03.09.99)
Name and mailing adress of the ISA/AT Austrian Patent Office Kohlmarkt 8-10; A-1014 Vienna Facsimile No. 1/53424/200	Authorized officer Hajos Telephone No. 1/53424/410

Form PCT/ISA/210 (second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR 99/00129

Im Recherchenbericht angeführtes Patentdokument Patent document cited in search report Document de brevet cité dans le rapport de recherche	Datum der Veröffentlichung Publication date Date de publication	Mitglied(er) der Patentfamilie Patent family member(s) Membre(s) de la famille de brevets	Datum der Veröffentlichung Publication date Date de publication
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